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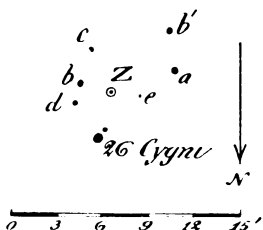
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## ASTRONOMICAL OBSERVATIONS IN 1904.

MADE BY TORVALD KÖHL, AT ODDER, DENMARK.

## VARIABLE STARS.

*Z Cygni.*

Jan. 17:	Z < e.	July 7:	= b'.
Feb. 15:	invisible	19:	= b.
Apr. 12:	< e.	Aug. 3:	{ < c.
19:	id.		{ > d.
May 7:	= d.	13:	= c.
13:	= c.	30:	= e.
19:	= b.	Sept. 11:	a little < e.
June 4:	id.	Oct. 9:	< e.
17:	{ > b.	Nov. 6:	id.
	{ < a.	Dec. 17:	invisible, ☉
		27:	< e.

*S Ursæ majoris.\**

Jan. 17:	S = g.	Aug. 3:	= f'.
Feb. 15:	< g.	13:	= g.
22:	invisible, ☉	22:	invisible, ☉
Mar. 2:	id.	28:	= g.
12:	= f.	31:	invisible.
28:	3 steps < e.	Sept. 4:	< g.
Apr. 2:	1 step < e.	10:	id.
12:	= e.	16:	invisible.
19:	1 step < d.	27:	id.
May 7:	2 steps > d.	Oct. 5:	11 mag.
13:	id.	9:	id.
19:	3 steps < b.	11:	id.
June 4:	2 steps < c.	Nov. 6:	= f.
17:	4 steps < c.	Dec. 17:	2 steps < e.
July 7:	= d.	27:	1 step < e.
19:	2 steps < e.	28:	id.

\* Vide the sketch in the Publications A. S. P., No. 73, page 56.

*T Ursæ majoris.\**

Jan. 17:	T < g.	Aug. 3:	= d.
Feb. 15:	invisible.	13:	id.
22:	id.	22:	= e.
Mar. 2:	id.	28:	{ < e.
12:	id.		> f.
28:	id.	31:	= f.
Apr. 2:	id.	Sept. 4:	a little > f.
12:	< g.	10:	1 step < f.
19:	5 steps < g.	16:	< g.
May 7:	= d.	27:	invisible, ©
13:	{ > c.	Oct. 5:	< g.
	< b.	9:	id.
19:	= b.	11:	id.
June 4:	1 step > a.	Nov. 6:	invisible.
17:	2 steps > a.	Dec. 17:	id.
July 7:	= a.	27:	id.
19:	= b.	28:	id.

*W Pegasi.†*

Jan. 17:	W 1 step > g.	June 4:	= d.
Feb. 12:	= e.	17:	id.
15:	{ > e.	July 7:	2 steps < e.
	almost = d.	19:	< f.
22:	= d.	Aug. 3:	= h.
Mar. 2:	= c.	13:	< h.
Apr. 12:	{ > c.	Sept. 4:	id.
	3 steps < b.	Oct. 9:	extremely faint.
19:	2 steps < b.	Nov. 6:	id.
May 13:	1 step < c.	Dec. 27:	a little > g.
19:	id.		

*Y Tauri.*

This star (BD 20° 1083) has been compared with A = BD 20° 1095, 7<sup>m</sup>.4 and b = BD 20° 1073, 8<sup>m</sup>.2.

Jan. 17:	Y > b.	Apr. 2:	> b.
Feb. 15:	distinctly > b.	12:	a little > b.
22:	> b.	Dec. 28:	> b.
Mar. 2:	= A.		
12:	{ < A.		
	> b.		

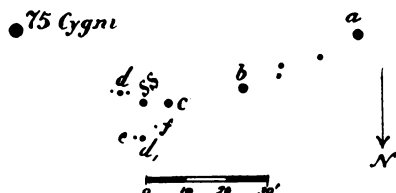
Very seldom I have seen the star fainter than b, as on 1903, January 19, when it was estimated almost = c (BD 20° 1082,

\* *Vide* the sketch in the *Publications A. S. P.*, No. 22, page 63.

† *Vide* the sketch in the *Publications A. S. P.*, No. 60, page 23.

8<sup>m</sup>.5). If we connect this minimum with the minima 1898, January 22, and 1899, April 2, a period of about fifteen months will appear.

*SS Cygni.*



Sep. 16.	<sup>h</sup> 9 P.M.	SS 2 steps	> c.	Oct. 5.	<sup>h</sup> 9 P.M.	1 step	< f.
	10¼		= c.		9.	9	< f.
	11¼		= c.		10.	9	id.
17..	8		= c.		11.	9	id.
18..	8	2 steps	> c.		13..	8	id.
19..	9½		id.	Nov. 6..	6		{ < c. > d.
20..	10	3 steps	> c.	Dec. 17.	6		invisible, ©
24..	9½		= e.	27..	8½		invisible.
27..	8	a little	< f.	32..	6		< f.

*Nova Persei.*

Jan.	19.....	<sup>h</sup> 7 P.M.	<sup>m</sup> 10.1	Aug.	13.....	<sup>h</sup> 2 A.M.	<sup>m</sup> 10.3
Feb.	15.....	8½	10.2	Sept.	4.....	10 P.M.	10.4
	22.....	7	10.1		10.....	9	10.4
March	2.....	8	10.1	Oct.	5.....	9	11.0
	12.....	8	10.0	Nov.	6.....	8	10.1
April	2.....	9	9.9	Dec.	28.....	8½	10.4
	12.....	9½	10.0				

The comparison-stars have been the stars in Georgetown College's Chart II, No. 42 (10<sup>m</sup>.1), og. No. 49 (11<sup>m</sup>.0). A decided maximum was observed on April 2d, a decided minimum on October 5th.

FIREBALLS.  
Seen from stations in Denmark and surrounding countries.

No.	Time.	Beginning.	End.	Mag.	Station.	Notes.
1	April 12, <sup>h</sup> 7 <sup>m</sup> 45 P. M.	.....	NE.	....	Vejle	A whistling was heard in Nyborg. The meteor disappeared at Christianssand in N., at Christiania in N.W. Eleven reports.
2	12, 10 22	.....	NW.	....	Vejle and several places in Denmark and Norway.	A large fireball passed over the North Sea and left behind a curious train, which remained visible for half an hour, forming a gigantic M. Twenty-two reports.
3	May 18, 9 30	.....	.....	....	Id. ....	Blue-green.
4	30, 8 54	.....	W.	<i>Sirius</i>	Nyborg. ....	Large light-green fireball.
5	July 10, 9 50	.....	.....	....	Copenhagen. ....	This large fireball exploded over Dalsland in Sweden, where a loud detonation was heard. Twenty-seven reports.
6	10, 10 55	.....	.....	....	Odder and several places in Denmark, Norway, Sweden, and Finland.	A violet-colored meteor.
7	30, 10 0	.....	.....	....	Karstad in Sweden.	The large meteor exploded in several parts.
8	Aug. 19, 8 30	.....	.....	....	Ringsted. ....	A green <i>cornered</i> meteor lighted up the whole region.
9	Oct. 7, 9 0	.....	.....	....	Byrum (Lasö) ..	A little fireball.
10	Nov. 26, 6 0	.....	W.	....	Christiania. ....	A beautiful meteor passed slowly across the northern sky from W.—E. and lighted up the whole region. The train remained visible for several minutes.
11	Dec. 14, 2 45 A.M.	.....	.....	....	Nakskov. ....	

## SHOOTING-STARS.

As usual, in the period August 9th-12th corresponding observations on shooting-stars were arranged for from stations in Denmark and surrounding countries. At six stations 140 paths of shooting-stars were mapped, but only two proved suitable for calculation. These two meteors have given the following results:—

## FOR OBSERVATION.

No.	Time.	Station.	Beginning.	Ending.	Mag.	Observer.
	h m s					
1	Aug. 9, 10 11 50 P. M.	Stade . . . . .	$46^{\circ} + 67.5$	$57^{\circ} + 69$	2	V. Dohn
		Odder . . . . .	$292 + 11$	$283 - 5$	1	T. Köhl
2	Aug. 12, 11 13 50 P. M.	Sonderburg..	$24 + 36$	$15 + 30$	2	M. Wolff
		Nyborg . . . . .	$3 + 37.5$	$346 + 27$	2	C. Frost

## FOR CALCULATION.

No.	Beginning.			Ending.			Real Length of the Path.	Radiant.
	<i>h</i>	$\lambda$	$\phi$	<i>h</i>	$\lambda$	$\phi$	$\beta$	<i>AR Decl.</i>
1	129	$2^{\circ} 9'$	$54^{\circ} 51'$	90	$2^{\circ} 34'$	$54^{\circ} 34'$	59	$25^{\circ} + 66$
2	123	$0^{\circ} 6'$	$55^{\circ} 18'$	96	$0^{\circ} 40'$	$54^{\circ} 59'$	58	$59^{\circ} + 47$

*h* and  $\beta$  are expressed in kilometers;  $\lambda$  is west longitude from Copenhagen;  $\phi$  is north latitude; *h* is the altitude of the meteor above the Earth's surface. Odder and Nyborg are situated in Denmark; Stade (Hanover) and Sonderburg (Schleswig), in Germany.

## DEVELOPMENT OF THE RECENT LARGE SUNSPOT.

BY ROSE O'HALLORAN.

On the morning of the 10th of January a spot of moderate dimensions was inside the northeast limb of the Sun, and on the morning following several small companion spots were in view. On the 12th, the foremost, and another some degrees in the rear, had increased considerably in size. In the fore-shortened view they were oval, connected by a straggling penumbral filament, and followed by a smaller spot. The